Design and Application of Anhui Radio and Television Station Advertising Preparation System: Post-print Version

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Abstract

The advertising preparation system is purpose-built for the advertising business workflow of Anhui Radio and Television Station. By fully leveraging existing software and hardware infrastructure, the system delivers comprehensive functionality with robust security and reliability. It implements an itemized advertising preparation-for-broadcast process, optimizes advertising management methodologies, substantially reduces operational workload, and significantly enhances work efficiency.

Full Text

Preamble

Title: Design and Application of the Advertising Preparation System at Anhui Radio and Television Station

Abstract: The advertising preparation system is designed specifically for the advertising business workflow of Anhui Radio and Television Station. By fully utilizing existing software and hardware platforms, the system delivers comprehensive functionality with high reliability and security. It implements an itemized advertising preparation workflow, optimizes advertising management methods, significantly reduces workload, and improves operational efficiency.

Keywords: advertising subsystem; advertising preparation system; broadcast subsystem; itemized preparation

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1. Project Background

The advertising business at Anhui Radio and Television Station involves multiple interconnected systems, including the Nanyang Advertising Management System, Dayang Advertising Editing System, and Dayang Broadcast System. The original business process was extremely cumbersome, relying on an advertising segment-based preparation method that followed a "item editing—packaging—modification—re-editing—repackaging for broadcast" model. This approach suffered from low efficiency and inflexibility, making it difficult to accommodate advertising material reuse and evolving business operations. Additionally, the existing advertising editing process had issues with proper AFD (Active Format Description) embedding. Therefore, this project builds upon the original infrastructure to develop a new advertising preparation system that leverages existing software and hardware platforms, implements an itemized advertising preparation workflow, optimizes management methods, and resolves AFD embedding issues.

2.1 System Interface Design

The advertising subsystem generates material lists according to the station's naming conventions and creates upload tasks that pass through the broadcast network security subsystem into the advertising preparation system. Simultaneously, the advertising subsystem generates fixed-time, fixed-duration advertising entries based on advertisers' time slots to form a daily advertising playlist, which is also transmitted to the advertising preparation system. Within the preparation system, uploaded materials undergo automatic technical review in the background, followed by content review at dedicated workstations where personnel examine technical review reports, metadata, and preview files to ensure content accuracy and quality. Materials that fail review are returned for re-upload, while approved materials enter the broadcast-ready state. The system automatically parses XML files containing advertising playlist information and transparently forwards this data to the broadcast subsystem, enabling advertising material review and ensuring broadcast readiness. The preparation system can also merge advertising segments according to the broadcast playlist to generate downloadable segment files.

2.2 Business Process Design

The overall workflow proceeds as follows: The Nanyang Advertising Management System handles advertising contract acceptance, review, information entry, and playlist scheduling, generating XML files compliant with Dayang system

specifications (containing advertising IDs, material descriptions, and broadcast information). For security isolation, these XML files undergo manual antivirus scanning before being imported into the advertising preparation system via offline file transfer. The preparation system automatically scans and parses the XML files to extract advertising IDs and metadata, automatically generating material upload tasks. Upload operators log into workstations to perform uploads, during which AFD information can be embedded and low-resolution proxies are automatically generated. After upload completion, initial reviewers verify the materials and, upon approval, the content passes to the review stage. Following successful review, the XML-derived advertising playlist information is parsed and transmitted to the broadcast system. The advertising preparation system maintains broadcast readiness by reviewing materials according to the advertising playlist and can merge advertising segments for download. Upon receiving the advertising playlist, the broadcast system merges it with the program schedule, and the GMP (Gateway Management Platform) queries the playlist and pulls advertising entry files from the broadcast-ready library according to established strategies. The preparation system also provides advertising download functionality to tape for emergency broadcast scenarios.

3.1 System Logical Storage Structure

Materials uploaded from advertising workstations generate both low-bitrate and high-bitrate files. Low-bitrate files use H.264 format at 1.5 Mbps, while high-bitrate files use MXF MPEG2 IBP format at 25 Mbps for standard definition and 50 Mbps for high definition. Low-bitrate files are stored in a low-resolution storage area with network access capabilities, enabling real-time preview when editing, deleting, or querying advertising playlists through browser-based clients. High-bitrate files reside in an upload storage area and, after approval, are migrated to both broadcast-ready and archive storage areas. The broadcast-ready storage area supplies materials for broadcast migration, while the archive storage area provides backup. If the broadcast-ready area lacks required materials, the preparation software checks the archive storage and automatically restores the advertising materials to the broadcast-ready area before transmission. If materials exist in neither location, the system alerts operators that re-uploading is necessary. Additionally, the broadcast-ready storage area provides functionality to download advertising materials to tape for emergency use by the advertising department.

3.2 System Composition

The system comprises several components: three advertising upload workstations (reusing existing hardware) support P2 and XDCAM file import, card-based signal capture, and dual-bitrate collection for both HD and SD con-

tent. One advertising download workstation (reusing existing hardware) enables flexible creation of download lists from multiple sources including advertising playlists, individual materials, and historical download lists, supporting export to P2, XDCAM, and tape media in either single-entry or segment-file modes with both normal and self-directed playlist editing options. Two advertising review workstations (reusing existing hardware) run standard review software for examining technical review information. One preparation system management workstation (reusing existing hardware) handles system configuration including storage area settings, user permissions, system parameters, and audiovisual specifications. Two application and interface servers connect with external systems according to standardized interface definitions, supporting advertising material and playlist file review and material search queries. Two content processing servers implement task monitoring and querying, Manager and Actor server monitoring, task import, and technical review task management. Two broadcast migration servers provide unified distribution and management of material management tasks.

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4. System Application Status

The advertising preparation system has been deployed across all channels since April 2016, operating for over one year without any broadcast incidents. Currently, all advertising materials are automatically submitted to the broadcast subsystem through the advertising preparation system, implementing itemized broadcast. The system uses individual advertising entry playback, allowing replacement of specific entries without affecting others, which dramatically reduces workload and improves efficiency while saving human resources. Advertising duration editing has decreased from 460 minutes per day to under 30 minutes, while advertising entry editing has dropped from over 1,300 entries daily to several dozen. Correspondingly, content review tasks have been substantially reduced from over 1,300 entries to just dozens of updated entries. Furthermore, the system enables advertisers to provide a single HD version of materials that can simultaneously serve both HD and SD channels, significantly increasing material input flexibility.

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Note: Figure translations are in progress. See original paper for figures.